National Research Council
Water Science and Technology Board

Community Hydrologic Prediction System

CHPS

NWS Workshop on Hydrologic Forecasting
Prague Campus
Czech University of Agriculture
June 20-24, 2005

Water Predictions
for
Life Decisions

CHPS – Why?

- Infuse new science into NWS operations
- Provide access to an expanded set of hydrometeorologic, hydrologic, and hydraulic models
- Enable fine space and time scale distributed hydrologic modeling
- Introduce parallel processing for ensemble predictions
- Support concurrent, distributed development
- Encourage scientific collaboration

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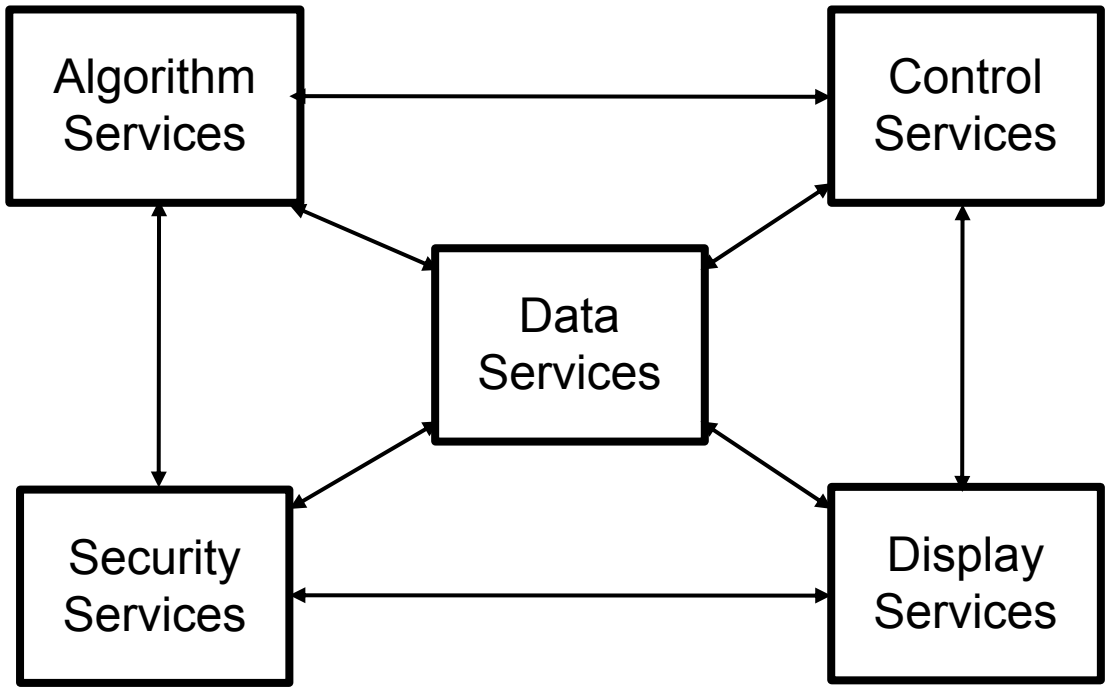
Service Oriented Architecture



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Service Oriented Architecture (SOA)

- Services encapsulate complex processes and systems, permitting controled change and continuous improvement of the underlying implementations
- Contrast with the current NWS River Forecast System (NWSRFS), a procedural, monolithic application
  - *NWSRFS traded architectural flexibility for performance*
  - *CHPS will attempt to attain both*

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Benefits of an SOA

- Data and algorithms are structured and identified through service protocols
  - *CHPS could provide hydrologic algorithms to the research community because services can be accessed by whomever has appropriate rights*
  - *Explicitly supports distributed R&D and distributed processing*
- Time from research to operations is reduced because adding a new algorithm or data service does not impact existing services – regression testing minimized

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CHPS – How?

- Adapt SOA to support NWS Hydrologic Forecasting business
  - *Incremental development/deployment*
  - *Overall architectural design*
  - *Proof-of-concept build/test*
- NWS river forecast operations continue every day while evolving to CHPS architecture
  - *Expand design element by element*
  - *Deliver new functional/data components as soon as they're ready*
- Provides a community hydrologic testbed with access to operational data

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CHPS – When?

- Develop Vision for evolving NWSRFS – November 2002
- Proof-of-concept workflow management service demonstrated – August 2003
- Architectural overview – January 2004
- River, Reservoir, and Snow (RRS) data service design – May 2004
- RRS prototype development – Fall 2004
- Deploy CHPS-RRS for River Forecast Center beta testing – 2005
- Find opportunities to add new algorithm services (i.e., USACE ResSIM) – as resources allow

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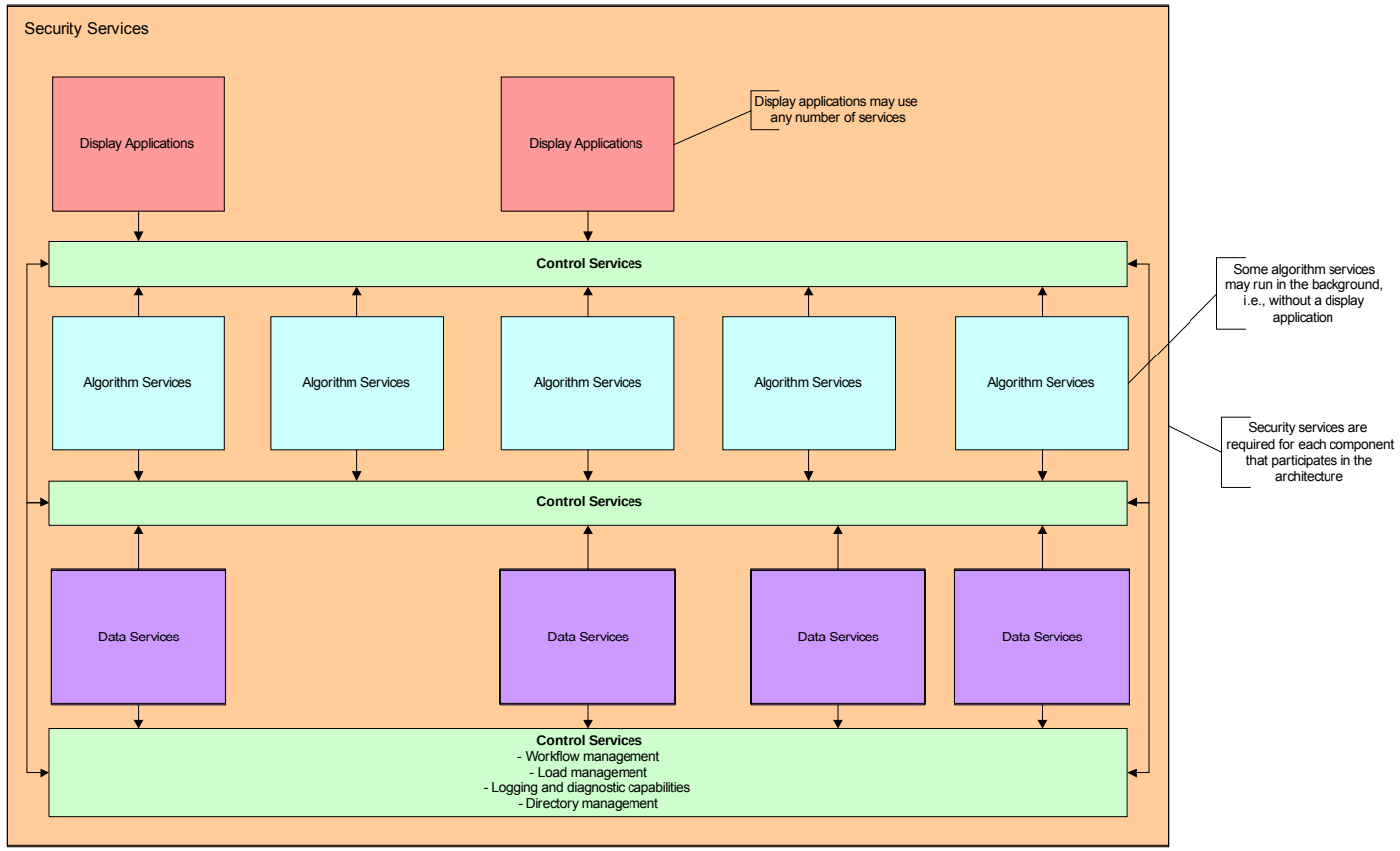
CHPS – Architectural overview



Note All components shown above reside in one or more application servers. Application servers may be located at NWS headquarters, any RFC or WFOs, and each application server may be configured with any combination of display applications, algorithm services and data services. Control services will have to be deployed uniformly across all application servers who participate in the OHD operational environment.

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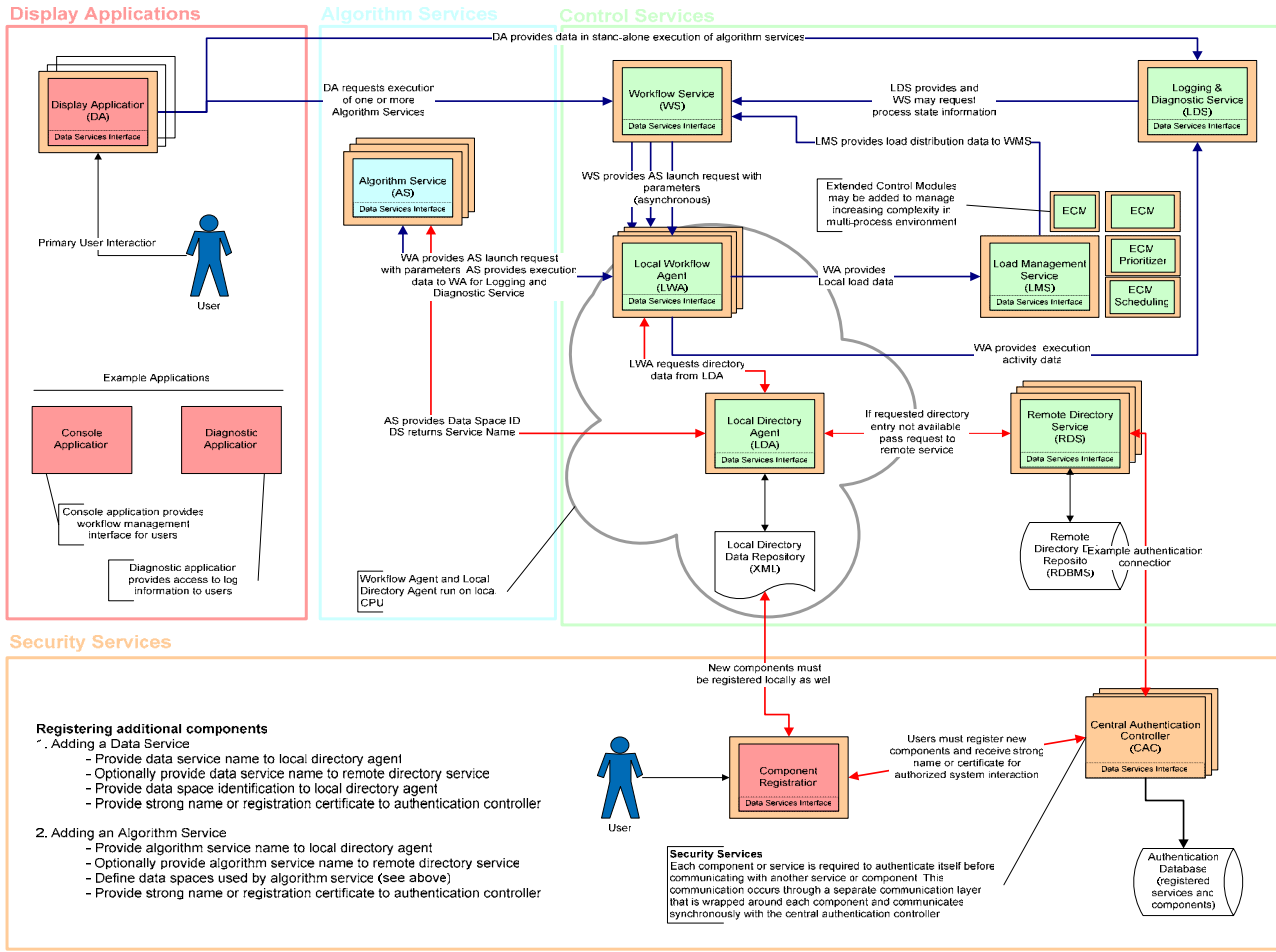
CHPS – Display, Algorithm, Control, Security



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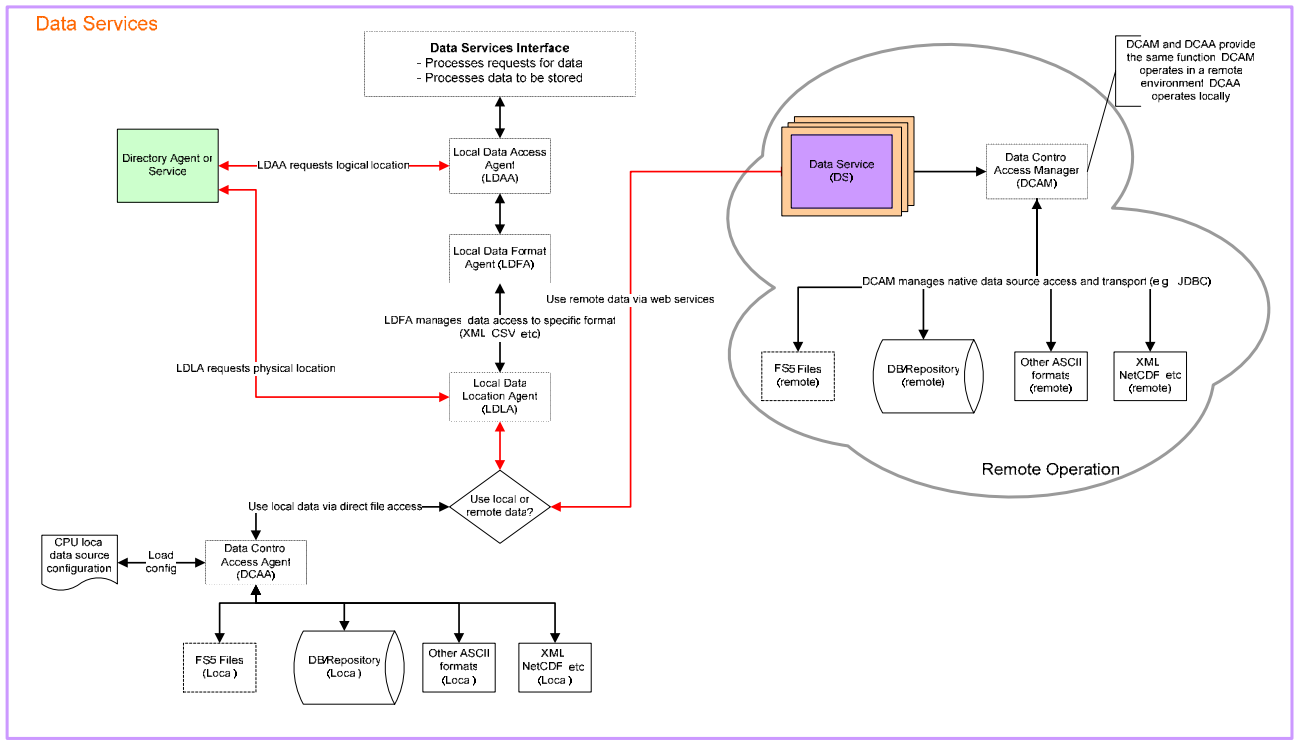
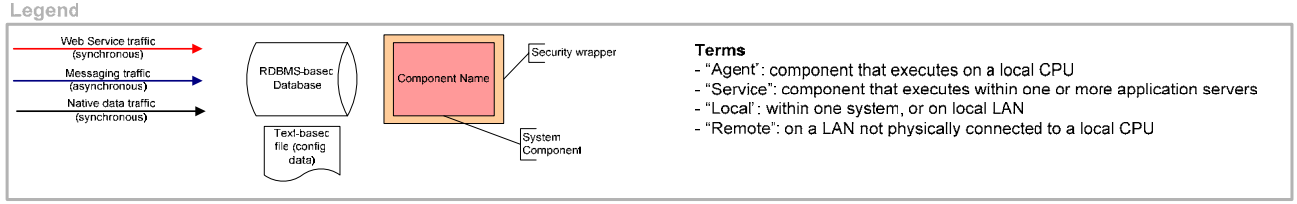
CHPS – Data Services





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CHPS – Expanded Opportunities

- Once the SOA strategy is proven in NWS river forecast operations CHPS can support concurrent development of new algorithm, data, or display services
- CHPS enables additional opportunities for collabortion with Federal water, private sector, and University partners

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